

CLAIMS

What is claimed is:

1. An electrode configured for electrical contact and passage of a fluid between the electrode and an adjacent cathodic element of a plasma arc torch, the electrode comprising:
 - a proximal end portion and a distal end portion;
 - a perimeter surface disposed at the proximal end portion and adjacent a perimeter surface of the cathodic element; and
 - a distal end portion defining a textured outer surface;wherein the adjacent perimeter surfaces provide the electrical contact and the passage of the fluid.
2. The electrode according to claim 1, wherein the electrode further comprises at least one passageway configured for passage of the cooling fluid proximate the electrical contact.
3. The electrode according to claim 2 wherein the passageway further comprises at least one flute formed on the electrode.
4. The electrode according to claim 3 wherein the passageway further comprises at least one helical flute formed on the electrode.
5. The electrode according to claim 1 wherein the electrode further comprises at least one rib and at least one flute disposed adjacent the at least one rib, the rib and the flute disposed along the perimeter surface of the electrode.

6. The electrode according to claim 1 wherein the electrode further comprises a plurality of ribs disposed adjacent a plurality of flutes, the ribs and the flutes disposed along the perimeter surface of the electrode.

7. The electrode according to claim 1 wherein the electrode further comprises a detent for connection to an adjacent component of the plasma arc torch.

8. The electrode according to claim 1 wherein the electrode further comprises at least one spot recess disposed proximate the electrical contact for passage of the fluid.

9. An electrode configured for electrical contact with a cathodic element of a plasma arc torch, the electrode comprising:

a proximal end portion and a distal end portion;

at least one passageway and a perimeter surface disposed at the proximal end portion and adjacent a perimeter surface of the cathodic element; and

a distal end portion defining a textured outer surface comprising a plurality of ridges,

wherein a cooling fluid passes through the passageway for cooling proximate the electrical contact and the adjacent perimeter surfaces provide the electrical contact.

10. The electrode according to claim 9 wherein the passageway further comprises at least one flute formed on the electrode.

11. The electrode according to claim 9 wherein the passageway further comprises at least one helical flute formed on the electrode.

12. An electrode configured for electrical contact and passage of a fluid between the electrode and an adjacent cathodic element of a plasma arc torch, the electrode comprising:

- a proximal end portion and a distal end portion;
- a perimeter surface disposed at the proximal end portion and adjacent
- a perimeter surface of the cathodic element; and
- a distal end portion defining a distal extension,

wherein the adjacent perimeter surfaces provide the electrical contact and the passage of the fluid.

13. The electrode according to claim 12, wherein the electrode further comprises at least one passageway configured for passage of the cooling fluid proximate the electrical contact.

14. The electrode according to claim 13 wherein the passageway further comprises at least one flute formed on the electrode.

15. The electrode according to claim 14 wherein the passageway further comprises at least one helical flute formed on the electrode.

16. The electrode according to claim 12 wherein the electrode further comprises at least one rib and at least one flute disposed adjacent the at least one rib, the rib and the flute disposed along the perimeter surface of the electrode.

17. The electrode according to claim 12 wherein the electrode further comprises a plurality of ribs disposed adjacent a plurality of flutes, the ribs and the flutes disposed along the perimeter surface of the electrode.

18. The electrode according to claim 12 wherein the electrode further comprises a detent for connection to an adjacent component of the plasma arc torch.

19. The electrode according to claim 12 wherein the electrode further comprises at least one spot recess disposed proximate the electrical contact for passage of the fluid.

20. An electrode configured for electrical contact with a cathodic element of a plasma arc torch, the electrode comprising:

a proximal end portion and a distal end portion;

at least one passageway and a perimeter surface disposed at the proximal end portion and adjacent a perimeter surface of the cathodic element; and

a distal end portion defining a distal extension,

wherein a cooling fluid passes through the passageway for cooling proximate the electrical contact and the adjacent perimeter surfaces provide the electrical contact.

21. The electrode according to claim 20 wherein the passageway further comprises at least one flute formed on the electrode.

22. The electrode according to claim 20 wherein the passageway further comprises at least one helical flute formed on the electrode.